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INTERNATIONAL STANDARD

**Superconductivity –
Part 14: Superconducting power devices – General requirements for
characteristic tests of current leads designed for powering superconducting
devices**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SUPERCONDUCTIVITY –

**Part 14: Superconducting power devices –
General requirements for characteristic tests of current
leads designed for powering superconducting devices**

FOREWORD

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International Standard IEC 61788-14 has been prepared by IEC technical committee 90: Superconductivity.

The text of this standard is based on the following documents:

FDIS	Report on voting
90/244/FDIS	90/250/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61788 series, published under the general title *Superconductivity*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this standard may be issued at a later date.

INTRODUCTION

Current leads are indispensable components of superconducting devices in practical uses such as MRI diagnostic equipment, NMR spectrometers, single crystal growth devices, SMES, particle accelerators such as Tevatron, HERA, RHIC and LHC, experimental test instruments for nuclear fusion reactors, such as ToreSupra, TRIAM, LHD, EAST, KSTAR, W7-X, JT-60SA and ITER, etc., and of advanced superconducting devices in the near future in practical uses such as magnetic levitated trains, superconducting fault current limiters, superconducting transformers, etc.

The major functions of current leads are to power high currents into superconducting devices and to minimize the overall heat load, including heat leakage from room temperature to cryogenic temperature and Joule heating through current leads. For this purpose, current leads are dramatically effective for lowering the overall heat load to use the high temperature superconducting component as a part of the current leads.

On the other hand, the current lead technologies applied to superconducting devices depend on each application, as well as on the manufacturer's experience and accumulated know-how. Due to their use as component parts, it is difficult to judge the compatibility, flexibility between devices, convenience, overall economical efficiency, etc of current leads. This may impede progress in the growth and development of superconducting equipment technology and its application to commercial activities, which is a cause for concern.

Consequently, it is judged industrially effective to clarify the definition of current leads to be applied to superconducting devices and to standardize the common characteristic test methods in a series of general rules.

SUPERCONDUCTIVITY –

Part 14: Superconducting power devices – General requirements for characteristic tests of current leads designed for powering superconducting devices

1 Scope

This part of IEC 61788 provides general requirements for characteristic tests of conventional as well as superconducting current leads to be used for powering superconducting equipment.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-815:2000, *International Electrotechnical Vocabulary (IEV) – Part 815: Superconductivity*

IEC 60071-1, *Insulation coordination – Part 1: Definitions, principles and rules*

IEC 60137, *Insulated bushings for alternating voltages above 1 000 V*